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# United States Patent [19]

**Kalt et al.**

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[54] **ELECTROMAGNETIC-WAVE MODULATING, MOVABLE ELECTRODE, CAPACITOR ELEMENTS**

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**Related U.S. Application Data**

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[51] **Int. Cl.**[6] ..... **H01G 7/00**; G01P 15/08

[52] **U.S. Cl.** ..... **361/280**; 73/514.32

[58] **Field of Search** ..... 361/280, 281, 361/283; 359/230, 223, 291, 231; 73/514, 517 R, 518; 345/48, 84, 85

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[57] **ABSTRACT**

Inventive electromagnetic-wave-modulating capacitors with movable electrodes are low-cost, low-energy, reliable and fast-acting elements for employment in highly transparent, conductive fixed electrodes and are incorporated, among others, in reflective display pixels for large and small-scale video displays, including full-color displays where multiple such capacitors are aligned in a single pixel. Further embodiments, not necessarily with a transparent electrode, are assemblable into array antennas deployable in outer space; provide digitally controllable or responsive such variable capacitors; and in mechanically active applications can be constituted as accelerometers, or in microrobotics. Constructions with ultra-thin electrodes have special advantages.

**31 Claims, 34 Drawing Sheets**